SOV/76-33-1-6/45

5(4), 24(8)
AUTHORS: Kolesov, V. P., Skuratov, S. M.

TITLE: Corrections for the Effects of Side-Processes in Calorimetric Measurements (Ob uchete vliyaniya pobochnykh protsessov v kalorimetricheskikh izmereniyakh)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 1, pp 32-35 (USSR)

ABSTRACT: The calculation of measurement results of calorimetric determinations is often rendered difficult, since the observed temperature changes of the calorimeter are influenced by the heat exchange of the calorimeter and medium as well as by other side-processes. It is stated that at a constant velocity of the side-processes a calculation of the correction in respect of the heat exchange based on the Regnault (Ren'o)-Pfaundler-Usov equation (Ref 1) can eliminate heat side effects on the measured results to almost 98%. An equation (6) for the calculation of errors occurring in the main part and towards the end of investigations with calorimeters with an isothermal cover is proposed. If the heat side effects are not more than 3% of the measured heat effects, these errors can be neglected. An equation for the correction of errors in the heat exchange in calorimetric investigations according to the adiabatic

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SOV/76-33-8-35/39

28(5)
AUTHORS: Vostroknutov, N. G., Kornilov, A. N., Gal'chenko, G. L., Skuratov, S. M. and Timofeyev, B. T.

TITLE: Arrangement for Measuring the Work of Alternating Current in Calorimetry

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 8, pp 1883-1886 (USSR)

ABSTRACT: For determining the heats of reaction taking place at higher rates with high temperatures, a calorimeter bomb with an electric furnace is usually used. Since, however, the resistance of the furnace greatly increases within a short time, the determination of the work of the current becomes very difficult if the amperage and voltage change in wide ranges. Reference 1 recommends in such cases to use a precision wattmeter, but fails to give any data regarding the pattern or the method of measurement to be used. Now an arrangement for measuring the work of the electric current in the furnace of a calorimeter bomb under the above circumstances is described. The wiring diagram (Fig 1) consists, in the main, of an active-current meter (I) and a reactance-current meter (II). For (I), a single-phase alternating current meter of the W Ei 55 (Siemens) type for 5 a and 120 v is used. In recent

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Arrangement for Measuring the Work of Alternating Current in Calorimetry

times, however, this instrument was replaced by a current meter of the V-3 type designed by N. G. Vostroknutov, VNIIK (Moscow) in order to raise the measurement accuracy. A current meter specially made for the requirements of (II) (Ref 2) was built at the otdeleniye elektricheskikh izmereniy VNIIK (Moskva) (Department of Electrical Measurements of the VNIIK (Moscow)). The measurement principle, the current meter calibration (Table), and the use of the arrangement in calorimetry are described, and the corresponding calculation equations are given. There are 1 figure, 1 table, and 3 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 27, 1959

SOV/20-126-2-27/64

5(4)
AUTHORS: Paukov, I. Ye., Kolesov, V. P., Skuratov, S. M.

TITLE: The Variation of the Isobaric-Isothermal Potential Under Standard Conditions for the Reaction of the Polymerization of ε-Caprolactam (Izmeneniye izobarno-izotermicheskogo potentsiala pri standartnykh usloviyakh dlya reaktsii polimerizatsii ε-kaprolaktama)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 2, pp 325-326 (USSR)

ABSTRACT: The present paper describes the results obtained by measuring the true specific heat of ε-caprolactam and poly-ε-caprolactam within the temperature range of 60 - 373°K. From these data ΔS and ΔZ (the significance of these quantities is not defined) are calculated for the polymerization reaction of ε-caprolactam under standard conditions. Measurements were carried out in an adiabatic vacuum calorimeter already described (Ref 5). A new calorimetric ampoule was constructed for the present investigation. Good agreement was, by the way, found to exist with the results obtained by other authors. The ε-caprolactam was distilled

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The Variation of the Isobaric-Isothermal Potential Under Standard Conditions for the Reaction of the Polymerization of ε-Caprolactam

5 times in an atmosphere of dry nitrogen, after which it was dried a long time over phosphorus pentoxide. The quantity of impurities in ε-caprolactam was 0.05 mol%. The poly-ε--caprolactam preparation was produced by dissolving the technical preparation in formic acid and by slow precipitation with water. Further treatment of the sample is briefly discussed. The values of the specific heat of ε-caprolactam and poly- ε -caprolactam are shown (in abridged form) in a table. For ε-caprolactam the deviation of some points from the smoothed curve c_p - T usually amounted to not more than 0.1 %, and only in rare cases they amounted to 0.2 %. For poly- ε -caprolactam these deviations may attain a value of 0.4 %. When measuring specific heat, the value 3847±8 cal/mol was obtained for the melting heat of ε-caprolactam, and for the melting point of pure ε-caprolactam the value 342.305°K was found. Neither the monomer nor the polymer shows an anomalous behavior of specific heat within the temperature range of from 60 to 373°K. The anomaly found in the course

The Variation of the Isobaric-Isothermal Potential Under Standard Conditions for the Reaction of the Polymerization of ε-Caprolactam

of an earlier investigation (Ref 7) was not confirmed. The standard values of the absolute entropies ($S^o_{298.16}$) were computed by numerical integration from the curves c_p - ln T. For $S^o_{298.16}$ of ε-caprolactam and of poly-ε-caprolactam the authors found the values 40.26 and 41.36 entropy units respectively. In the polymerization of ε-caprolactam at 298.16°K entropy is therefore varied by +1.1 entropy units. For this reaction the value of ΔH is -37 kcal/mol. Therefore, the isobaric-isothermal potential of this reaction at 298.16°K is varied by ΔZ = -4.0 kcal/mol. The amount of this variation is thus essentially determined by the variation of enthalpy. There are 1 table and 7 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

The Variation of the Isobaric-Isothermal Potential Under Standard Conditions for the Reaction of the Polymerization of ε-Caprolactam

SOV/20-126-2-27/64

PRESENTED: February 6, 1959, by P. A. Rebinder, Academician

SUBMITTED: February 4, 1959

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5(3,4)
AUTHORS: Kozina, M.P., Skuratov, S.M. SOV/20-127-3-22/71

TITLE: The Polymerization Enthalpy of N-Substituted Lactams.

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 3, pp 561-563 (USSR)

ABSTRACT: Up to now there existed no experimental data which would have made it possible to explain the differing polymerizability of heterocyclic compounds of a certain homologous series. Several authors explain this phenomenon by the alteration of the enthalpy and entropy in the reactions concerned. The alteration of the enthalpy in the polymerization process can be determined rather easily as the difference between the combustion heat of the monomer and a polymer link (the latter value can be calculated most reliably in many cases). The whole matter is much more complicated as far as the entropy values are concerned: there are hardly any experimental results for the corresponding substances, while the efforts of determining them by computation do not always yield reliable values. However, the variation of the entropy of polymerization reactions of carbocyclic compounds with 5-8 links is not

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very high (for example for ε-caprolactam, Ref 4). The thermo-dynamic potential on the whole is determined by the alteration of the enthalpy (ΔH). Thus the investigation of the combustion heat and the calculation of the enthalpy alteration from it, is not useless, although there exist no data on entropies. At present the authors estimated the ΔH values of the polymerization reactions of lactams with 5 to 8 links in the cycle. As is known, even a substituent of the C-atom reduces the polymerizability of a compound (Ref 5). The polymerization of amides is even more reduced by a substituent of the nitrogen atom. It was even said that N-substituted lactams cannot be polymerized at all (Ref 6). After it was found that N-methyl-enantholactam can be polymerized (Ref 7), it was interesting to obtain data on the ΔH of the polymerization reaction of methyl-substituted lactams with 5-8 links in the cycle. The present paragraph gives determination results of the combustion heat of N-methyl-caprolactam, N-methyl-enantholactam and N-methyl-ethyl-propion-amide. The combustion heat of the latter was used for computations. The synthesis and the purification of the mentioned substances was carried out in the Institut

iskusstvennogo volokna (Institute for Synthetic Fibres) by N. F. Yerofeyeva. Their physico-chemical constants are shown by table 1. The fourth column gives the enthalpies of isothermal (25°) combustion in liquid state with 1 atm. All enthalpies under discussion were determined from them. Table 2 shows a comparison of the ΔH_n-values of N-methyl-substituted lactams with the ΔH_n-values determined earlier in the same way, (Ref 1), for the non-substituted lactams with the same number of links in the cycle. The results prove that no polymerization takes place in either series of the compounds with enthalpies below 3.9 kcal/mol under the conditions mentioned above. There are 2 tables and 11 references, 8 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: April 4, 1959, by A. A. Balandin, Academician

SUBMITTED: March 30, 1959

SOV/20-127-4-23/60

5(3,4)
AUTHORS: Shtekher, S. M., Skuratov, S. M., Dankshas, V. K., Levina, N. Ya.

TITLE: Heats of Combustion of Some Branched Alkanes

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 4, pp 812-814 (USSR)

ABSTRACT: The authors describe the use of additive schemes for calculating the values of physico-chemical properties of hydrocarbons for which experimental values are missing. In the molecules of the simplest hydrocarbon group, i.e. the alkanes, there are simple C-C and C-H bonds. But as regards their contributions to certain physico-chemical properties, all these bonds cannot be considered equivalent. A scheme built up on such assumptions would be very simple, yet it is known to be incapable of reflecting the differences of the properties between the isomers. Hence, it is unavoidable to establish a more careful classification of these bonds. A number of additive schemes are presently available which - with a certain accuracy - permit the calculation of the heats of combustion (besides other properties) of alkanes (Refs 1-10). The most logical scheme was developed by V. M. Tatevskiy (Ref 5). The authors are criticising the latter

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In view of its divergences from experimental results. As only one example was available of an alkane with a substitution in a 2,2,4,4-position which showed the divergences mentioned, it was felt to be interesting to find out whether similar phenomena occurred in other alkanes of identical grouping; further, whether the degree of these divergences remained constant, or whether it depends on the structure of the remaining parts of the molecule. Furthermore, it seemed interesting to determine the heats of combustion of such compounds in which the quaternary C-atoms are not separated by one but two methyl groups. For these structures the heat of combustion calculated should agree with the experimental values. The schemes (1),(2), and (3) explain the structure of the hydrocarbons whose heat of combustion was determined. A. G. Anikin of the Laboratoriya termodinamiki khimicheskogo fakul'teta (Laboratory for Thermodynamics of the Chemical Department) of the University mentioned below, determined the purity of the substances investigated according to fusion curves. The method of determining the heat of combustion had already been described earlier by the second author et al (Ref 15). Table 1 shows the experimental results obtained. For the sake of comparison, column 2 contains not only

the values calculated by a scheme developed by V. M. Tatevskiy, but also the difference Δ. Herefrom it may be seen that all hydrocarbons whose molecules contain a group of two quaternary C-atoms, separated by a CH_2 group, show experimental values of the heat of combustion diverging from the values calculated by about 5±1 kcal/mol. This value must be taken into consideration for calculations according to Tatevskiy. If, however, the 2 quaternary C-atoms are separated by 2 CH_2-groups, the two values are concordant, as was to be expected within the limits of the experimental error. L. V. Fedorchuk and I. Baukh participated in these investigations. There are 1 table and 15 references, 6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: April 13, 1959, by A. N. Nesmeyanov, Academician

SUBMITTED: April 10, 1959

SOV/2o-127-5-23/58

5(2,4)

AUTHORS: Gal'chenko, G. L., Kornilov, A. N., Timofeyev, B. I., Skuratov, S. M.

TITLE: The Standard Enthalpy of Boron Oxide Formation

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 5, pp 1o16 - 1o18 (USSR)

ABSTRACT: The enthalpy of B_2O_3 mentioned in the title is a fundamental quantity in the thermochemistry of the boron compounds. Its determination is connected with considerable experimental difficulties. Due to this fact the values mentioned in publications (Refs 1-13) do not agree (-270,-368 kcal/mol). No reliable value may be chosen from it since in part of the papers (Refs 1-9) the errors caused by the side processes cannot be detected whereas in the other part of these papers data lack permitting the utilization of the obtained results. In the present paper a report is made on an experimental determination of the mentioned quantity by 3 independent methods which (within the limit of measuring errors) led to one and the same result. 1) C o m b u s t i o n o f b o r o n i n o x y g e n , 2) D i r e c t d e t e r m i n a -

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tion of the heat of formation of boron nitride and the computation of the ΔH^{o}_{form} of B_2O_3 by using a reliably determined value of the combustion heat of boron nitride (Ref 18). 3) Direct determination of the heat of formation of BCl_3 and the computation of ΔH^{o}_{form} of B_2O_3 by using reliably determined heat values for the BCl_3 hydrolysis (Ref 19), and the B_2O_3 dissolution (Ref 20) as well as the H_2O formation and of the HCl solution corresponding to the concentration (Ref 14). The above mentioned agreement of the results obtained according to the methods 1-3 proves that considerable systematical errors have been avoided in each of the determinations. There are 22 references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: April 7, 1959, by V. N. Kondrat'yev, Academician
SUBMITTED: April 4, 1959

SOV/20-128-1-35/58

5(4)

AUTHORS: Kolesov, V. P., Paukov, I. Ye., Skuratov, S. M., Seregin, E. A.

TITLE: The Standard Entropies of Some Lactams

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 1, pp 130-132 (USSR)

ABSTRACT: In spite of the numerous papers recently written on the measurement of the real specific heat of substances at low temperatures, data for organic substances are as yet rather sparse. Whereas the alkanes and alkenes have been investigated somewhat more thoroughly, data for heterocyclic compounds are lacking completely. Calculation of entropies according to semiempiric formulas (Refs 1-3) gives inexact values. The authors speak about measurements of specific heat at low temperatures (60 - 350°K) and of the melting heat of the following lactams: α-pyrrolidone, α-piperidone, ε-caprolactam, and ζ-oenanthole-lactam. The synthesis and purification of these compounds was carried out by N. F. Yerofeyeva and V. N. Topchebasheva at the Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute for Artificial Fibers). Table 1 shows the measuring

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The Standard Entropies of Some Lactams

results, figure 2 the variation of specific heat with temperature. This variation is nearly linear, within the temperature interval measured, with different inclination towards the abscissa axis in the case of individual compounds. Table 2 mentions the melting temperatures and melting heats of the lactams investigated. For calculation of the absolute entropies, the curves of the specific heats were extrapolated from 60°K to 0°K by means of equations composed of Debye- and Einstein functions. These equations satisfy the experimental data within the interval of 60 - 170°K. Table 3 gives the absolute entropy standards of the solid lactams at 298.16°K and of liquid lactams at 350°K. There are 1 figure, 3 tables, and 5 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: May 13, 1959, by P. A. Rebinder, Academician

SKURATOV, S. M., BONETSKAYA, A. K., VOLOKHINA, A. V. and KUDRYAVTSEV, G. I. (USSR)

Protsess poliamidirovaniya v tverdoi faze
Polyamidation reaction in the solid phase
IUPAC S II:465-71

report presented at the Intl. Symposium on Macromolecular Chemistry, Moscow, 14-18 June 60.

BONETSKAYA, A.K.; YEROFEYEVA, N.F.; SKURATOV, S.M.

Kinetics and thermal effect of the hydrolysis of some lactams. Izv.vys.ucheb.zav.; khim.i khim.tekh. 3 no.6:1027-1030 '60. (MIRA 14:4)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova, kafedra fizicheskoy khimii.
(Lactam)

VOROB'YEV, A.F.; SKURATOV, S.M.

Standard enthalpy of formation of carbon tetrafluoride.
Zhur.neorg.khim. 5 no.7:1398-1401 Jl '60.
(MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet. Termokhimicheskaya laboratoriya im. V.F.Luginina.
(Carbon tetrafluoride) (Enthalpy)

VOROB'YEV, A.F.; KOLESOV, V.P.; SKURATOV, S.M.

Standard enthalpy of formation of silicon tetrachloride.
Zhur.neorg.khim. 5 no.7:1402-1408 Jl '60.
(MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet. Termokhimicheskaya laboratoriya im. V.F.Luginina.
(Silicon chloride)

S/078/60/005/009/020/040/XX
B017/B058

54700

AUTHORS: Kolesov, V. P., Skuratov, S. M., and Uvarov, V. Ya.

TITLE: Determination of the Specific Heat of Aqueous Hydrofluoric Acid Solutions

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 9, pp. 1934 - 1937

TEXT: For the determination of the specific heat of hydrofluoric acid, a calorimeter was designed which is schematically shown in Fig. 1. The temperature was measured by means of a Pt resistance thermometer, a KL-48 (KL-48) potentiometer, and an M-25/3 (M-25/3) mirror galvanometer as a balancing instrument. The specific heat of HF solutions with a molality from 0.0956 to 2.0095, determined at 20°C, is lower than that at 25°C. The values found at 20°C are lower by 0.1% than the data by Roth and Becker (4) and by 0.3% lower than those by Thorwaldson and Bailay (6). The results of determinations of the

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[illegible] solutions of hydrofluoric acid at different [illegible] are given in Tables 1 and 2. The apparent specific heat F_s of HF exceeds that of other hydrohalic acids. The dependence of F_s on [illegible] the higher F_s value of hydrofluoric acid is probably due to partial depolymerization of the hydrofluoric acid molecules when heated. The concentration dependence F_s of hydrofluoric acid is given by the following formula:

$$F_s = 1.5 + 2.80\ M^{1/2}$$

The specific heat of HF solutions at 25°C for N = 20 to N = 100 was tabulated. There are 2 figures, 3 tables, and 9 references: 1 Soviet, 2 US, 1 British, 1 Canadian, and 4 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova (Moscow State University imeni M. V. Lomonosov), Termokhimicheskaya laboratoriya im. V. F. Luginina (Thermochemical Laboratory imeni V. F. Luginin)

SUBMITTED: June 9, 1959

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84211
S/078/60/005/010/001/021
B004/B067

AUTHORS: Galchenko, G. L., Kornilov, A. N., Skuratov, S. M.

TITLE: Combustion Heat of Boron

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 10, pp. 2141-2147

TEXT: The authors discuss the strong spread of the values of the standard formation enthalpy of B_2O_3 hitherto published (Refs. 1-9). The combustion of boron in the presence of organic substances leads to uncontrollable side reactions and, hence, to unreliable values. Therefore, the authors determined the formation enthalpy of B_2O_3 by three methods. In this paper, they describe the combustion of boron in oxygen. Boron contained in a quartz bowl was heated to 1000°C in a bomb calorimeter (Fig.) at 7 atm oxygen pressure by means of a small electric furnace. The authors explain the calculation of the heat generated by the electric furnace by means of the empirical equation

$$Q_{el} = (a/r) \int_0^t v^2 dt + b \quad (1).$$

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The constants a and b were determined; r denotes the resistance of the heating element, V its voltage. The integral $\int V^2 dt$ was calculated for the time intervals t = 10 sec and t = 180±0.2 sec (time of switching off) by means of the trapeze method. V was measured every 10 - 15 sec by means of a Disselhorst potentiometer and M-21 (M-21) mirror galvanometer. As is shown in Table 1, the values obtained for Q_e from equation (1) are in good agreement with the experimental data. For determining the enthalpy 0.17 - 0.25 boron were weighed into the bomb. After its combustion, the increase in weight of the weighed-in portion was determined in dry air, and the small portion of evaporated boron oxide was dissolved and titrated by washing the bomb (Table 2). Attempts of extracting B_2O_3 from the reaction mass by means of water and of determining it titrimetrically led to low values (Table 3). Extraction remains incomplete. Due to the short duration of action of the high temperature, amorphous boron and vitreous boron oxide are assumed as final products and calculated under these conditions: $\Delta H_{form\ B_2O_3\ glass} = -298.7 \pm 1.8$ kcal/mole. There are 1 figure, 3 tables, and 16 references: 3 Soviet, 8 US, 1 British, 1 French, and 3 German.

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B004/B067

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov). Termokhimicheskaya laboratoriya im. V. F. Luginina (Laboratory of Thermochemistry imeni V. F. Luginin)

SUBMITTED: August 21, 1959

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85620

S/078/60/005/012/001/016
B017/B064

// 2222/

AUTHORS: Galichenko, G. L., Timofeyev, B. I., and Skuratov, S. M.

TITLE: Determination of the Formation Enthalpy of Boron Tetrachloride

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960. Vol. 5, No. 12, pp. 2645-2650

TEXT: The present paper describes the calorimetric determination of the reaction heat of boron with chlorine. The chlorination of boron was carried out in a bomb calorimeter heated by a small electric furnace. The method of determining the formation heat of boron tetrachloride is described in detail. The following values were determined for the formation enthalpy of liquid and gaseous BCl_3:

$$\Delta H^{\circ}_{\text{formation } BCl_3 \text{ liquid}} = -102.9 \pm 0.6 \text{ kcal/mole}$$

$$\Delta H^{\circ}_{\text{formation } BCl_3 \text{ gas}} = -97 \pm 0.7 \text{ kcal/mole}$$

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Determination of the Formation Enthalpy of Boron Tetrachloride

S/078/60/005/012/001/016
B017/B064

The experimental data were compared with published ones. The formation enthalpy of vitreous boron oxide from crystalline boron and gaseous oxygen was calculated to be

$$\Delta H^{o}_{\text{formation } B_2O_3 \text{ glass}} = -301.8 \pm 1.4 \text{ kcal/mole.}$$

The thermochemical equations to calculate the formation enthalpy are given. On the basis of the values found for $\Delta H^{o}_{\text{formation } BCl_3 \text{ liquid}}$ and the thermochemical equations, the formation enthalpy of vitreous boron oxide from crystalline boron and gaseous oxygen was calculated:

$$\Delta H^{o}_{\text{formation } B_2O_3 \text{ glass}} = -301.8 \pm 1.4 \text{ kcal/mole.}$$

There are 1 figure, 2 tables, and 8 references: 1 Soviet, 4 US, 1 British, 1 French, and 1 Swiss.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov). Termokhimicheskaya laboratoriya im. V. F. Luginina (Thermochemical Laboratory imeni V. F. Luginin)

SUBMITTED: August 21, 1959

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85621

S/078/60/005/012/002/016
B017/B064

11.1300

AUTHORS: Gal'chenko, G. L., Kornilov, A. N., Skuratov, S. M.

TITLE: Determination of the Formation Enthalpy of Boron Nitride

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 12, pp. 2651-2654

TEXT: The formation heat of boron nitride was determined in a calorimetric bomb heated by a small electric furnace. Amorphous high-purity boron (O: 0.23%, H: 0.12%, N: 0.005%, and Ca, Mg, and Cu totaling ~0.01%) was used as initial material. For the experiments, nitrogen was freed from oxygen, and dried. A table lists the results of determining the reaction heat between boron and nitrogen. The formation enthalpy of hexagonal boron nitride from crystalline boron and gaseous nitrogen was calculated, and the following values were determined:

$$\Delta H^{\circ}_{\text{formation}}{}^{BN}_{\text{crystalline}} = -60.7 \pm 0.3_4 \text{ kcal/mole.}$$

The formation enthalpy of boron oxide was determined by the following thermochemical equations:

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Determination of the Formation Enthalpy of Boron Nitride

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B017/B064

$$2\,B_{crystalline} + N_{2\,gas} = 2\,BN_{crystalline}$$
$$\Delta H = -121.4 \pm 0.7 \text{ kcal}$$
$$2\,BN_{crystalline} + 3/2\,O_{2\,gas} = B_2O_{3\,glass} + N_{2\,gas}$$
$$\Delta H = -180.4 \pm 1.2 \text{ kcal (according to Ref. 5)}$$

$$2\,B_{crystalline} + 3/2\,O_{2\,gas} = B_2O_{3\,glass}$$
$$\Delta H^{o}_{formation\,B_2O_{3\,glass}} = -301.8 \pm 1.4 \text{ kcal/mole.}$$

This value is in agreement with published values (Refs. 6, 12, and 13). There are 1 figure, 1 table, and 13 references: 4 Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov). Termokhimicheskaya laboratoriya im. V. F. Luginina (Thermochemical Laboratory imeni V. F. Luginin)

SUBMITTED: August 21, 1959

Card 2/2

S/076/60/034/05/36/038
B010/B003

AUTHORS: Vorob'yev, A. F., Privalova, N. M., Skuratov, S. M.

TITLE: A Calorimeter for Measuring the Enthalpy of the Decomposition of Solids

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 5, pp. 1142-1144

TEXT: A calorimeter is described (Fig.), which is used for measuring low thermal effects at high temperatures and the enthalpy of the decomposition of solids. The capacity of the calorimeter in which temperatures up to 700°C can be attained by means of a constantan heating coil, is about 40 ml. The coil produces a temperature of 600-700°C within 7-10 sec after the current was sent through, whereby only 40-80 cal are emitted. The casing of the calorimeter is heated by a second heating element. The difference in temperature between the calorimeter and its casing is determined by means of a mirror galvanometer to within 0.0005°C. Table 1 lists measured values of the water equivalent of the calorimeter

√c

A Calorimeter for Measuring the Enthalpy of the Decomposition of Solids

S/076/60/034/05/36/038
B010/B003

with the outer heating element. These values were calculated by the adiabatic method. For control purposes the water equivalent of the calorimeter with the inner heating coil was also determined (Table 2, measured values), and in both cases (Tables 1 and 2) a value of about 72 cal/degree was obtained. There are 1 figure, 2 tables, and 2 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 23, 1959

Card 2/2

Skuratov, S.M.

9-3

5.4700

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S/020/60/132/01/31/064
B011/B126

AUTHORS: Kachinskaya, O. N., Togoyeva, S. Kh., Meshcheryakov, A. P., Skuratov, S. M.

TITLE: Heats of Combustion of 1,1-Dimethyl-2-alkyl Cyclopropanes

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 1, pp. 119-122

TEXT: The heats mentioned in the title were measured in the liquid phase. The authors give calculation formulas for all compounds of the above-mentioned homologous series. Temperature determination methods are described in Ref. 7. The substances analyzed were synthesized by the methods given in Ref. 5. They contained (according to Raman spectra) no alkenes. The authors analyzed 1,1-dimethyl-2-ethyl cyclopropane, 1,1-dimethyl-2-propyl cyclopropane, and 1,1-dimethyl-2-n-hexyl cyclopropane. Table 1 shows the heats of combustion of these compounds after 2 final distillations. From this it can be seen that their heat of combustion has not changed after the last distillation. By using the additive method concerning types and sub-divisions according to the hypothesis of V. M. Tatevskiy (Refs. 1, 2), the authors derive the general formula for calculating the said heats (1). For 1,1-dimethyl-2-n-alkyl cyclopropane (alkyl - any

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radical, from ethyl on, that is, when n ⩾ 7) the equation (1) assumes the form of (2). From the values of the heats of combustion of 1,1-dimethyl-2-ethyl- and 1,1-dimethyl-2-hexyl cyclopropanes and from the ascertained value A_{22} (156.2$_3$ kcal/mole), the heats of combustion of 1,1-dimethyl-2-propyl-, 1,1-dimethyl-2-n-butyl-, and 1,1-dimethyl-2-n-amyl cyclopropane were calculated. These heats ($-\Delta H^0_c$) and the heats of formation ($-\Delta H^0_f$) are set out in table 3. As can be seen from the given data, the calculated and the experimentally obtained heats of combustion agree. Concerning the stressed three- and four-membered rings the question still remained open, as to whether such a ring influences the properties of the side chains. It follows from the data given here that the cyclopropane ring does not influence the character of the bonds in the substituting alkyl, from ethyl on. This conclusion can apparently also be extended to alkylcyclobutane compounds. Thus, the heats of combustion of compounds of the 1,1-dimethyl-2-n-alkyl cyclopropane (n-alkylethyl and higher substituents) series can be calculated from equation (3). Equation (4) has the same object. From the heats of combustion of 1,1-dimethyl-2-ethyl-, 1,1-dimethyl-2-n-propyl-, and 1,1-dimethyl-2-n-hexyl cyclopropanes, as well as from the values of A_{22} (see

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above) and A_{21} (-263.238 kcal/mole) which are given in publications, the authors calculated the increment c' which occurs in equations (1) and (2). It was shown that c = 851.74 kcal/mole. The values of c' calculated for $-\Delta H_f$, R_M, and V_M are shown in table 2. It has now become possible to work out the heats of combustion not only for normal, but also for (from the second C-atom in the alkyl radical on) branched 1,1-dimethyl-2-alkyl cyclopropanes. In this case equation (1) assumes the form of equation (5). The value of the coefficients A_{ij} for the C-C bonds of different sub-types of branched alkanes can be taken from publications (Ref. 1). There are 3 tables and 8 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: December 22, 1959, by A. N. Nesmeyanov, Academician

SUBMITTED: December 16, 1959

Card 3/3

VOROB'YEV, A.F.; PRIVALOVA, N.M.; STOROZHENKO, L.V.; SKURATOV, S.M.

Standard enthalpies of formation of some picrates. Dokl. AN SSSR 135 no.5:1131-1132 D '60. (MIRA 13:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lononosova. Predstavleno akademikom A.N.Frumkinym.

(Enthalpy) (Picric acid)

S/020/60/135/006/020/037
B016/B060

11.2110

AUTHORS: Vorob'yev, A. F., Privalova, N. M., Monayenkova, A. S., and Skuratov, S. M.

TITLE: Standard Enthalpies of the Formation of Perchloric Acid and Some Perchlorates

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1388-1390

TEXT: The authors report on standard formation enthalpies established by them concerning (1) perchlorates of potassium, sodium, and barium, (2) perchloric acid, and (3) perchlorates of lithium, ammonium, calcium, and magnesium. The law by Hess served for calculations in cases (1) and (3). For case (2) the enthalpy was determined by two independent methods: (a) on the basis of the formation enthalpies of $KClO_4$, and (b) of $NaClO_4$, a system of thermochemical equations 1 - 6 being used corresponding to ΔH_1 - ΔH_6. The resulting equation 6 reads for the case (b):

$\Delta H_6 = \Delta H_1 + \Delta H_2 \quad \Delta H_3 - \Delta H_4 + \Delta H_5$, or:

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Standard Enthalpies of the Formation of Perchloric Acid and Some Perchlorates

S/020/60/135/006/020/037
B016/B060

$1/2H_{2\,(gas)} + 1/2Cl_{2\,(gas)} + 2O_{2\,(gas)} + (450H_2O) = HClO_{4\,(solution\,HClO_4 \cdot 450H_2O)}$

For the case (a) the concentration of the $KClO_4$ solution was set equal to $KClO_4 \cdot 4500H_2O$. Corresponding to the acid and alkali concentration in the reaction of neutralization amounted to $HClO_4 \cdot 4500H_2O$ and $KOH \cdot 25H_2O$, respectively, ΔH_1 was determined on the basis of the data obtained in the first part of the work. ΔH_2 and ΔH_3 were measured experimentally, ΔH_4 and ΔH_5 were taken from the literature. The agreement between the values obtained by methods (a) and (b) confirms their reliability. These values are listed in Table 2. The formation enthalpies of NaCl and KCl were calculated on the basis of data found in the literature. For the formation enthalpy of $BaCl_2$ the authors based on their own experiments (Table 1) in addition to data by H. Siemonsen (Ref. 3). The enthalpies of perchlorates dealt with in Chapter I were determined by measuring their decomposition enthalpies in corresponding chlorides and oxygen in a massive air-tight microcalori-

Card 2/3

meter devised for the purpose (description in Ref. 1). Table 1 lists the measurement results. (3) Apart from the law by Hess the thermochemical equations given in Chapter II were used for calculating the formation enthalpies. The dissolution enthalpies of the perchlorates mentioned, the neutralization enthalpies of perchloric acid by CaO and MgO as well as by solutions of LiOH and NH_4OH were measured experimentally. The value (-29.77 ± 0.17 kcal/mole) found in Chapter II of the article under consideration was used for the formation enthalpy of the $HClO_4$ solution. The formation enthalpies of CaO and MgO as well as of the solutions of LiOH and NH_4OH and of liquid water are taken from the literature. Table 3 lists the results. There are 4 tables and 5 references: 2 Soviet, 1 French, and 2 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: July 5, 1960, by A. N. Frumkin, Academician

SUBMITTED: July 5, 1960

BONETSKAYA, A.K.; YEROFEYEVA, N.F.; SKURATOV, S.M.; MUROMOVA, R.S.

Kinetics and thermal effect of the hydrolysis of some N-substituted lactams. Izv.vys.ucheb.zav.; khim.i khim.tekh. 4 no.1:74-77 '61. (MIRA 14:6)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova, kafedra fizicheskoy khimii.
(Lactams) (Hydrolysis)

S/078/61/006/004/003/018
B121/B216

AUTHORS: Sokolova, N. D., Skuratov, S. M., Shemonayeva, A. M. Yuldasheva, V. M.

TITLE: Determination of the standard enthalpy of formation of the alpha and beta modification of metaboric acid

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 4, 1961, 774-776

TEXT: The standard enthalpies of formation of the alpha and beta modifications of metaboric acid were obtained by determining the standard enthalpies of solution at 295°K. α-HBO_2 was prepared by heating analytical grade H_3BO_3 for several days in an ampulla under a vacuum of 10-20 mm Hg at 90°C. β-HBO_2 was obtained by heating boric acid in an open ampulla to 160°C in the course of 8 hr and keeping it at this temperature for several days. X-Ray analytical data indicated the products to be the pure α- and β modifications. X-Ray analysis was made by A. A. Babad-Zakhryapin at the Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical

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Chemistry, Academy of Sciences USSR). The measurements were carried out in a calorimeter with an adiabatic jacket. Metaboric acid was introduced into the calorimeter in closed ampullas which were then broken. The thermometer readings were correct to $\pm$ 0.0005°. The water equivalent of the calorimeter was determined by electrical heating ($\sim$ 171 cal/deg). The temperature rise was 0.03-0.06°C for α-HBO_2, and 0.17°C for β-HBO_2. The enthalpy of solution of α-HBO_2 was measured to be 700 and 400 mole H_2O for a final concentration of 1 mole H_3BO_3, both values agreeing within the measuring error. For β-HBO_2, the enthalpy of solution was measured at a final concentration of 1 mole H_3BO_3 to 500 mole H_2O. The enthalpies of formation of the alpha and beta modifications of metaboric acid determined at final concentrations of 1 mole H_3BO_3 to 500 mole H_2O are

α-HBO_2 $\quad \Delta H_{293} = + 0.47 \pm 0.01$ kcal/mole

β-HBO_2 $\quad \Delta H_{293} = + 1.76 \pm 0.01$ kcal/mole

The standard enthalpies of formation of the alpha and beta modifications

Determination of the standard ...

of metaboric acid from crystalline boron and gaseous oxygen and hydrogen were calculated at α-HBO_2 $\Delta H^o_{formation} = -189.0 \pm 0.4$ kcal/mole

β-HBO_2 $\Delta H^o_{formation} = -190.3 \pm 0.4$ kcal/mole

There are 2 tables and 10 references: 3 Soviet-bloc and 7 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova, Khimicheskiy fakultet (Moscow State University imeni M. V. Lomonosov, Chemical Division)

SUBMITTED: March 4, 1960

Card 3/3

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S/078/61/006/008/001/018
B121/B205

AUTHORS: Kolesov, V. P., and Skuratov, S. M.

TITLE: Standard formation enthalpy of lithium fluoride

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 8, 1961, 1741-1744

TEXT: To determine the standard formation enthalpy of LiF, the authors experimentally found the quantities ΔH_3 (enthalpy of neutralization of $Li(OH)_{aq}$ in HF_{aq}) and ΔH_4 (solubility enthalpy of LiF_{cryst} in water). The concentration of the LiF solutions was 1 mole of LiF in 3800 moles of H_2O at 21.5°C. The calorimetric determinations were made in an apparatus according to V. P. Kolesov, M. M. Popov, and S. M. Skuratov (Ref. 5: Zh. neorgan. khimii 4, 1233, 1959) described earlier. For determining the solubility enthalpy of LiF_2, isothermal and adiabatic methods were used. A value of -16.45 ± 0.03 kcal/mole was found for ΔH_3, and a value of 1.25 ± 0.02 kcal/mole for ΔH_4. A value of +1.18 ± 0.02 kcal/mole had been found earlier for the solubility enthalpy of LiF in water by A. F. Kapustinskiy and M. S. Stakhanov (Ref. 12: Trudy Moskovsk. khim.

Card 1/2

S/078/61/006/012/001/011
B110/B147

AUTHORS: Kolesov, V. P., Martynov, A. M., Skuratov, S. M.

TITLE: Standard enthalpy of aluminum-fluoride formation

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 12, 1961, 2623-2626

TEXT: The enthalpy $\Delta H^{o}_{form}AlF_3$ according to H. Gross, C. Hayman, D. L. Levi (see below) was determined experimentally: $2Al + 3PbF_2 = 2AlF_3 + 3Pb$ (1). To find out the effect of various factors, the experimental conditions were varied. Lead fluoride was precipitated from pure $Pb(CH_3COO)_2$ by 4% H_2F_2 (free of SO_4^{2-}, SiF_6^{2-}, and Fe^{2+}), filtered off, dried at 150-200°C, and molten in a dry Ar stream. The purity of Al was 99.99 or 99.60% (≤ 0.1 and 0.2 mole% of Fe content). Experiments were made in a calorimeter bomb whose mantle temperature was kept constant with an accuracy of ±0.01 - 0.02°C. The accuracy of measurement of the calorimeter value with empty bomb = 2867.4 ± 1.6 cal/degree) was 0.05%. The

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particle size of the PbF_2 - Al mixture (Al excess: 50 - 500%) was < 0.3 mm. The bomb was filled with Ar (1.5 - 2 atm). At 25°C, the enthalpy change of (1) was -117 ± 0.6 kcal. The assumption that the reaction was incomplete or that side reactions took place proved to be wrong. Impurities in Ar, however, hardly affect the results. The cause for inaccuracy (± 0.6 kcal) in the calorimetry measurement could not be found, nor could the accuracy of the measurement be improved. There is no systematic error in the method of measurement. Inaccuracy is due to the sum of error sources. The ΔH of (1) obtained by the authors in 24 experiments was -117.7 ± 0.6 kcal, ΔH obtained by Gross et al. in 6 experiments was -117.7 ± 0.1 kcal. $\Delta H^{o}_{form}{}_{AlF_3} \sim 357.0$ kcal/mole was calculated from ΔH of (1) determined, and from $\Delta H^{o}_{form}{}_{PbF_2}$ = -159.5 kcal/mole with a probable accuracy of ± 2 kcal/mole. The slight deviation from the value calculated by Gross et al. is explained by the use of another $\Delta H^{o}_{form}{}_{PbF_2}$ value.

There are 13 references, 2 Soviet and 11 non-Soviet. The three most recent references to English-language publications read as follows: R. Gross, C. Hayman, D. L. Levi. Trans Faraday Soc., 50, 477 (1954);

Standard entropy of [illegible] indium fluoride ... 2410,2147

[illegible] comprehensive treatise on inorganic and theoretical [illegible], Vol. [illegible] (Suppl. to Vol. I, 1956); F. D. Rossini, Selected Values of Chemical Thermodynamic Properties. Nat. Standards Circ. 500, 1952.

[illegible] Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Termokhimicheskaya laboratoriya im. V. P. Luginina (Moscow State University imeni M. V. Lomonosov. Thermochemical Laboratory imeni V. P. Luginin)

SUBMITTED October 6, 1960

Card 2/2

SKURATOV, S.M.; KOLESOV, V.P.

Standard enthalpies of the formation of halo derivatives of methane. Zhur. fiz. khim. 35 no.5:1156-1161 My '61.
(MIRA 16:7)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Methane) (Enthalpy)

SKURATOV, S.M.; KOLESOV, V.P.

First All-Union Conference on Calorimetry. Zhur.fiz.khim. 35 no.8:1896-1899 Ag '61. (MIRA 14:8)
(Calorimetry--Congresses)

SKURATOV, S.M.

Decisions passed by the First All-Union Conference on Calorimetry. Zhur.fiz.khim. 35 no.8:1899-1900 Ag '61. (MIRA 14:8)

1. Predsedatel' Organizatsionnogo komiteta Pervoy vsesoyuznoy konferentsii po kalorimetrii, Moskva.
(Calorimetry--Congresses)

28290

S/076/61/035/010/009/015
B106/B101

11.1210
11.0132

AUTHORS: Kozina, M. P., Skuratov, S. M., Shtekher, S. M., Sosnina, I. Ye., and Turova-Polyak, M. B.

TITLE: Combustion heats of some bicyclanes

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 10, 1961, 2316-2321

TEXT: The authors determined the combustion heats of some bicyclic hydrocarbons with rings of 5, 6, and 7 members at 25°C. Only one series of publications exist on this subject which did not indicate either the measuring methods applied or the dependability of the results obtained (Ref. 3: (a) J. A. Goodman a. P. H. Wise, J. Amer. Chem. Soc., 73, 850, 1951; (b) K. T. Serijan a. P. H. Wise, J. Amer. Chem. Soc., 73, 4766, 5191; 74, 365, 1952; (c), (d) see below). The following hydrocarbons were examined: dicyclopentyl, dicyclopentyl methane, cyclopentyl cyclohexane, cyclopentyl cycloheptane, dicycloheptyl, trans-β-methyl decalin. The hydrocarbons were purified chromatographically on silica gel of the type KCM(KSM), then subjected to fractional vacuum distillation and finally subjected to chromatography on silica gel for another 2 or 3 times. Their

Card 1/6

Combustion heats of some ...

purity was determined by a cryoscopic method developed by A. G. Anikin, Ya. I. Gerasimov, and G. M. Dugacheva (Ref. 8: Dokl. AN SSSR, 110, 576, 1956). The calorimetric bomb used (Fig. 2) was designed by the thermokhimicheskaya laboratoriya MGU (Thermochemical Laboratory of Moscow State University), and had the following advantages as compared to other types of bombs: lower thermal inertness, simple and dependable valve construction for introducing and removing the gases, and insulated ignition wires resistant to the flame of the burning substance. The bomb was filled with oxygen free from combustion impurities to a pressure of 30 atm. Temperature of the calorimeter was measured by a specially designed thermometer allowing readings of an accuracy of 0.0002°C. Correction for the heat exchange was calculated according to the formula by Regnault-Pfaundler-Usov, and did not exceed 1% of the temperature ascent. The caloric value of the calorimeter system was determined by burning benzoic acid produced by the Vsesoyuznyy nauchno-issledovatel'skiy institut metrologii im. D. I. Mendeleyeva (All-Union Scientific Research Institute of Metrology imeni D. I. Mendeleyev). The weight of the burned substance was found by determining the quantity of carbon dioxide produced by combustion. Carbon dioxide was absorbed by ascarite and its quantity determined by weighing

Card 2/6

Combustion heats of some

the absorption vessel. Accuracy of this method of CO_2 determination was ± 0.02%. Table 4 shows the results of determinations. By comparing the data obtained with the known values for the combustion heat of the corresponding monocyclanes (Ref. 13: Sj. Kaarsemaker a. J. Coops, Rec. trav. chim., 71, 261, 1952) and of trans-decalin (Ref. 14: G. F. Davies a. E. C. Gilbert, J. Amer. Chem. Soc., 63, 1585, 1941) the following relations could be established: combustion heat of any bicyclane consisting of rings with more than 4 carbon atoms:

$\Delta H^{25}_{comb} = \Delta H' + \Delta H'' + 60.1$ kcal/mole ($\Delta H'$, $\Delta H''$ = combustion heats of monocyclanes constituting the corresponding bicyclane; 60.1 kcal/mole = reaction enthalpy for forming a molecule of bicyclane and a molecule of hydrogen from 2 molecules of the corresponding monocyclanes); combustion heats of trans-β-alkyl decalins (for nonramified alkyl radicals):

$\Delta H^{25}_{comb} = 1500.3 + 154.2 + (n-1)\cdot 156.2$ kcal/mole (1500.3 = combustion heat of trans-decalin; 154.2 = increment of the CH_2 group directly bound to the ring; 156.2 = increment for a CH_2 group in the nonramified alkyl radical;

Card 3/6

Combustion heats of some ...

n = number of carbon atoms in the alkyl radical); combustion heats of bicyclanes separated by a methylene group, i.e., compounds of the type X-CH_2-Y (X-, Y- = radicals of the corresponding monocyclanes):

$\Delta H^{\circ}_{comb} = (\Delta H_X + \Delta H_Y) \cdot 60.1 + 155.3$ kcal/mole (ΔH_X, ΔH_Y = combustion heats of the corresponding monocyclanes; 155.3 = increment of the CH_2 group bound to two rings); isomerization enthalpies for the liquid state at 25°C: dicyclopentyl to trans-decalin (ΔH°_{is} = -13.2 kcal/mole); cyclopentyl cyclohexane to trans-β-methyl decalin (ΔH°_{is} = 8.0 kcal/mole); dicyclopentyl methane to trans-β methyl decalin (ΔH°_{is} = -14.2 kcal/mole).

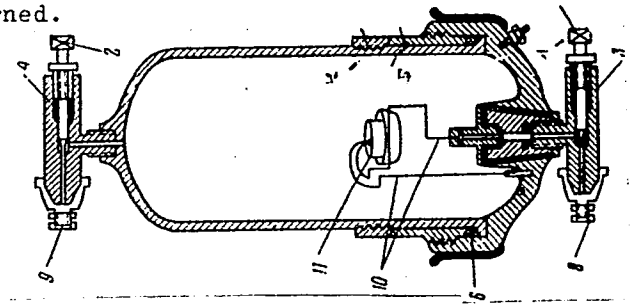
There are 1 figures, 4 tables and 15 references: 6 Soviet and 9 non-Soviet bloc. The three most recent references to English-language publications read as follows: J. B. Greenshields a. F. D. Rossini, J. Res. Nat. Bur. Standards, 62, 271, 1958; Ref. 3: (c) R. M. Caves, R. L. McLaughlin a. P. H. Wise, J. Amer. Chem. Soc., 76, 511, 1954; (d) J. H. Lamneck, jr, a. P. H. Wise, J. Amer. Soc., 76, 5105, 1954.

Card 4/6

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 25, 1960

Fig. 2. Cross section of the calorimetric bomb. Legend: (1), (2) conical valves for introducing and removing the gas; (3), (4) stuffing boxes; (5) sleeve nut for sealing the bomb; (6) rubber packing ring; (7) threaded ring to keep packing tight, when pressure drops to 1 atm in the bomb; (8), (9) connecting terminals; (10) ignition wires; (11) cup holding the substance to be burned.



Card 5/6

SKURATOV, S.M.; [illegible], S.M.

Refinement of the values of constants [illegible] Kirkwood's series for the calculation of the heats of combustion of alkanes. Dokl. AN SSSR 137 no. 1:109-110 Mr-Ap '61. (MIRA 14:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova. Predstavleno akademikom A.N. Nesmeyanovym.
(Paraffins) (Heat of combustion)

KOZINA, M.P.; LUKINA, M.Yu.; ZUBAREVA, N.D.; SAFONOVA, I.L.; SKURATOV, S.M.; KAZANSKIY, B.A., akademik

Heat of combustion of some phenylcyclopropanes. Dokl.AN SSSR 138 no.4:843-845 Je '61. (MIRA 14:5)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova i Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.
(Benzene) (Heat of combustion)

GURVICH, Lev Veniaminovich, kand. khim. nauk; KHACHKURUZOV, Georgiy Akopovich, kand. khim. nauk; MEDVEDEV, Vadim Andreyevich, kand. khim. nauk; VEYTS, Inessa Veniaminovna, kand. khim. nauk; BERGMAN, Georgiy Andreyevich; YUNGMAN, Vladimir Stepanovich; RTISHCHEVA, Nina Petrovna; KUMATOVA, Lidiya Fedorovna; YURKOV, Georgiy Nikolayevich; KANE, Amaliya Abramovna; YUDIN, Boris Fedorovich; BROUNSHTEYN, Boris Isidorovich; BAYBUZ, Viktor Feodoseyevich; KVLIVIDZE, Valeriy Aleksandrovich; PROZOROVSKIY, Yevgeniy Aleksandrovich; VOROB'YEV, Boris Aleksandrovich; GERASIMOV, Ya.I., retsenzeng; SKURATOV, S.M., prof., retsenzent; GLUSHKO, V.P., akad., otv.red.; KHACHKURUZOV, G.A., red.; GUROV, K.P., red.izd-va; LAUT, V.G., tekhn.red.

[Thermodynamic properties of individual substances; reference guide in two volumes] Termodinamicheskie svoistva individual'nykh veshchestv; spravochnik v dvukh tomakh. Izd.2., polnost'iu perer. i rasshirennoe. Pod red. V.P.Glushko (otv. red.) i dr. Moskva, Izd-vo Akad. nauk SSSR. Vol.1.(Calculation of thermodynamic properties] Vychislenie termodinamicheskikh svoistv. 1962. 1161 p. Vol.2. [Tables of thermodynamic properties] Tablitsy termodinamicheskikh svoistv. 1962. 916 p.
(MIRA 15:10)

(Continued on next card)

B/190/62/004/003/022/023
B103/B101

11,2210
15,2641

AUTHORS: Rafikov, S. R., Tomareva, M. G., Churlov, S. M., Mikhaylov, N. V.

TITLE: Combustion heats of polypropylene of different structure

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 3, 1962, 465 - 467

TEXT: The combustion heats of isotactic polypropylene and of the fractions obtained therefrom by extraction with ether and heptane were measured to repair the lack of experimental data permitting a comparatory estimate of intermolecular interaction energy in the chains of isotactic and atactic polymers. Respective data of the two different samples (I and II) served as test material: Viscosimetric molecular weight: 80,000 and 180,000; ether fraction content: 11.5 and 4.5%; heptane fraction content: 11.5 and 4.5%; isotactic crystalline polypropylene: 77 and 81%; ash content: 0.01 - 0.02%. $TiCl_3 + Al(Et)_3$ was the catalyst in polymerization. Combustion took place in a self-packing steel bomb (design by the MGU thermomechanical laboratory). Initial oxygen pressure

Card 1/3

Combustion heats of...

was 30 atm. The temperature measurement (method described in Ukh. Zapiski MGU, no. 164, 73, 1953) was accurate within 0.02 - 0.03°. Mean values of combustion heats (cal/g, reduced to 25°C) measured in I for initial sample, ether fraction, heptane fraction, and residue from extraction (isotactic crystalline portion) are as follows: 11067 ± 1.2, 11033.8 ± 1.5, 11079.3 ± 2.1, and 11068.1 ±2.2, respectively. In II: 11056 ± 2.5, 11030.4 ± 2.2, 11064 ± 1.4, and 11056.3 ± 1.4, respectively. The slight decrease of combustion heat in the ether fraction, and the increase in the heptane fraction compared with the value for the initial sample cannot be explained by assuming that the solvent is incompletely removed from the samples. The difference in the combustion heat values is as yet difficult to explain. The values of the ether fraction and isotactic portion show that isotactic polymer is chiefly formed by stereospecific synthesis in the presence of $TiCl_3 + Al(Et)_3$, whereas atactic polymer is chiefly formed in the presence of $TiCl_4 + Al(Et)_3$ as the catalyst (as previous experiments have proved). The difference between results for I and II is due to the different degree of structural regularity in the two samples. The combustion heats of rapidly and

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S/190/62/004/003/022/023
B143/B101

Combustion heats of...

slowly cooled samples (initial polymer and pure isotactic polymer) are equal. There are 2 tables. The most important English-language references is: G. Natta, J. Polymer Sci., <u>16</u>, 143, 1955; G. Natta, P. Pino, P. Corradini, F. Danusso, E. Mantica, G. Mazzanti, G. Moraglio, J. Amer. Chem. Soc., <u>77</u>, 1708, 1955.

ASSOCIATION: Nauchno-issledovatel'skiy institut iskusstvennogo volokna (Scientific Research Institute of Synthetic Fibers)

SUBMITTED: March 15, 1961

Card 3/3

APPROVED FOR RELEASE: 08/24/2000 CIA-RDP86-00513R001651210013-1"

S/190/62/004/012/002/015
B101/B186

AUTHORS: Skuratov, S. M., Yenikolopyan, N. S., Bonetskaya, A. K., Voyevodskiy, V. V.

TITLE: Mechanism of lactam polymerization

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 12, 1962, 1770-1778

TEXT: In continuation of papers of 1952-54 (last publication Dokl. AN SSSR, 95, 1017, 1954), the polymerization of ε-caprolactam and ζ-enantholactam was studied in the presence of water, water and acid, and water and alkali at 231.5°C. A slightly modified reaction scheme is proposed on the basis of experimental results concerning induction period, maximum reaction rate, time before maximum reaction rate is reached, degree of conversion, heat effect of the reaction: (1) $B + H_2O \underset{k'_1}{\overset{k_1}{\rightleftharpoons}} AH$; (2) $AH + AH \xrightarrow{k_2} P + H_2O$;

(3) $AH + P \xrightarrow{k_3} P + H_2O$; (4) $AH + B + X \xrightarrow{k_4} P + X$; (5) $B + P \xrightarrow{k_5} P$;

Card 1/3

Mechanism of lactam...

(6) $B + H_2O + X \xrightarrow{k_6} AH + X$; (7) $AH + X \xrightarrow{k_7} B + H_2O + X$; where B = lactam. AH = amino acid, P = polyamide, X = catalyst. The probable course of these reactions under different conditions is discussed, and the following equations are derived for the rate of polymerization, w: (A) for polymerization of ε-caprolactam in the presence of H_2O: $w = \alpha'[H_2O][B]([B_o]^2 - [B]^2)$, where $\alpha' = k_4k_6/2k_7$; (B) for polymerization of ζ-enantholactam in the presence of water: $w = \alpha'[H_2O][B]\sqrt{[B_o]^2 - [B]^2}$; where $\alpha' = k_5^{0.5}k_2^{0.5}k_6/k_3$; (C) for polymerization of ε-caprolactam in the presence of H_2O and H_3PO_4: $w = \beta'\sqrt[4]{[AcH][B]}\sqrt{[B_o]^2 - [B]^2}$, where $\beta' = (k_4k_5k_6[H_2O]/k_7)^{0.5}$, and AcH = acid; (D) for polymerization of ζ-enantholactam in the presence of H_2O and H_2PO_4: $w = \alpha'\sqrt[4]{[AcH][B]}\sqrt[4]{[B_o]^2 - [B]^2}$, where $\alpha' = k_2^{0.25}k_5^{0.75}k_6^{0.5}[H_2O]^{0.5}/k_3^{0.5}$; (e) in the polymerization of ε-caprolactam and ζ-enantholactam in the presence of H_2O and NaOH, the presence of

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Mechanism of lactam...

NaOH only reduces the induction period without affecting the polymerization kinetics proper. All the experimental results are satisfactorily explained by these equations. There are 3 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 24, 1962

Card 3/3

S/190/62/004/012/003/015
B101/B186

AUTHORS: Yenikolopyan, N. S., Bonetskaya, A. K., Skuratov, S. M.

TITLE: Induction period of ε-caprolactam and ζ-enantholactam polymerization under various conditions

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 12, 1962, 1779-1783

TEXT: A set of reaction equations was drawn up in a previous paper (Vysokomolek. soyed., 4, 1770, 1962) for the polymerization of ε-caprolactam and ζ-enantholactam in the presence of water, water and acid, and water and alkali: (1) $B + H_2O \underset{k_1'}{\overset{k_1}{\rightleftharpoons}} AH$; (2) $AH + AH \xrightarrow{k_2} P + H_2O$; (3) $AH + P \xrightarrow{k_3} P + H_2O$; (4) $AH + B + X \xrightarrow{k_4} P + X$; (5) $B + P \xrightarrow{k_5} P$; (6) $B + H_2O + X \xrightarrow{k_6} AH + X$; (7) $AH + X \xrightarrow{k_7} B + H_2O + X$; where B = lactam, AH = amino acid, P = polyamide, X = catalyst, whose functioning groups are either the end-groups of P, in the case of polymerization with water, or

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Induction period of...

H_3^+O ion in the case of polymerization in the presence of acid. In the present paper, the experimental data are used for deriving equations for the induction period as dependent on the amount of H_2O added. Reaction (1) catalyzed by the amino acid gives rise to: $B + H_2O + AH \xrightarrow{k_1'} AH + AH$. The induction period $t = (1/\varphi) \ln w/\alpha$; where $w = \alpha e^{\varphi t}$, $\alpha = k_5' k_1 [B]/k_1'$, and $\varphi = k_1' [B][H_2O]$. In agreement with the experiment, the induction period is inversely proportional to the amount of water added. The induction period decreases with an increased addition of NaOH. In this case, the cooperation of the hydroxyl ion must be taken into account besides reaction (1) and the catalysis by the amino acid: $B + H_2O + OH^- \xrightarrow{k_1''} AH + OH^-$. Hence, $t = (1/\varphi)(\ln w - \ln \alpha)$, where $\varphi = k_2' [B][H_2O]$, $\alpha = k_5' k_1'' [B][OH^-]/k_1'$. Consequently, the kinetics of polymerization proposed interprets the reaction courses correctly. There are 2 figures and 1 table.

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S/190/62/004/012/003/015
B101/B186

Induction period of...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 24, 1961

Card 3/3

SKURATOV, S.M.; VOROB'YEV, A.F.; PRIVALOVA, N.M.

Enthalpies of formation of some perchlorates. Zhur.neorg.khim. 7 no.3:677-679 Mr '62. (MIRA 15:3)

1. Moskovskiy gosudarstvennyy universitet.
(Perchlorates) (Enthalpy)

KORNILOV, A. N.; LEONIDOV, V. Ya.; SKURATOV, S. M.

Standard heats of formation of the higher carbides of niobium and tantalum. Vest. Mosk. un. Ser. 2: Khim. 16 [i.e.17], no.6: 48-50 N-D '62. (MIRA 16:1)

1. Kafedra fizicheskoy khimii Moskovskogo universiteta.

(Niobium carbide) (Tantalum carbide)
(Heat of formation)

KOLESOV, V.P.; ZENKOV, I.D.; SKURATOV, S.M.

Standard enthalpy of the formation of tetrafluoroethylene.
Zhur. fiz. khim. 36 no.1:89-92 Ja '62. (MIRA 16:8)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova, Termokhimicheskaya laboratoriya im. V.F. Luginina.
(Ethylene) (Enthalpy)

KOLESOV, V.P.; SEREGIN, E.A.; SKURATOV, S.M.

Adiabetic calorimeter of small volume for the determination of true heat capacities within the temperature range of 12 to 340°K. Zhur. fiz. khim. 36 no.3:647-651 Mr '62. (MIRA 17:8)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

KOLESOV, V.P.; PAUKOV, I.Ye.; SKURATOV, S.M.; Prinimali uchastiye: FUN SHI-YAN'; SEREGIN, E.A.

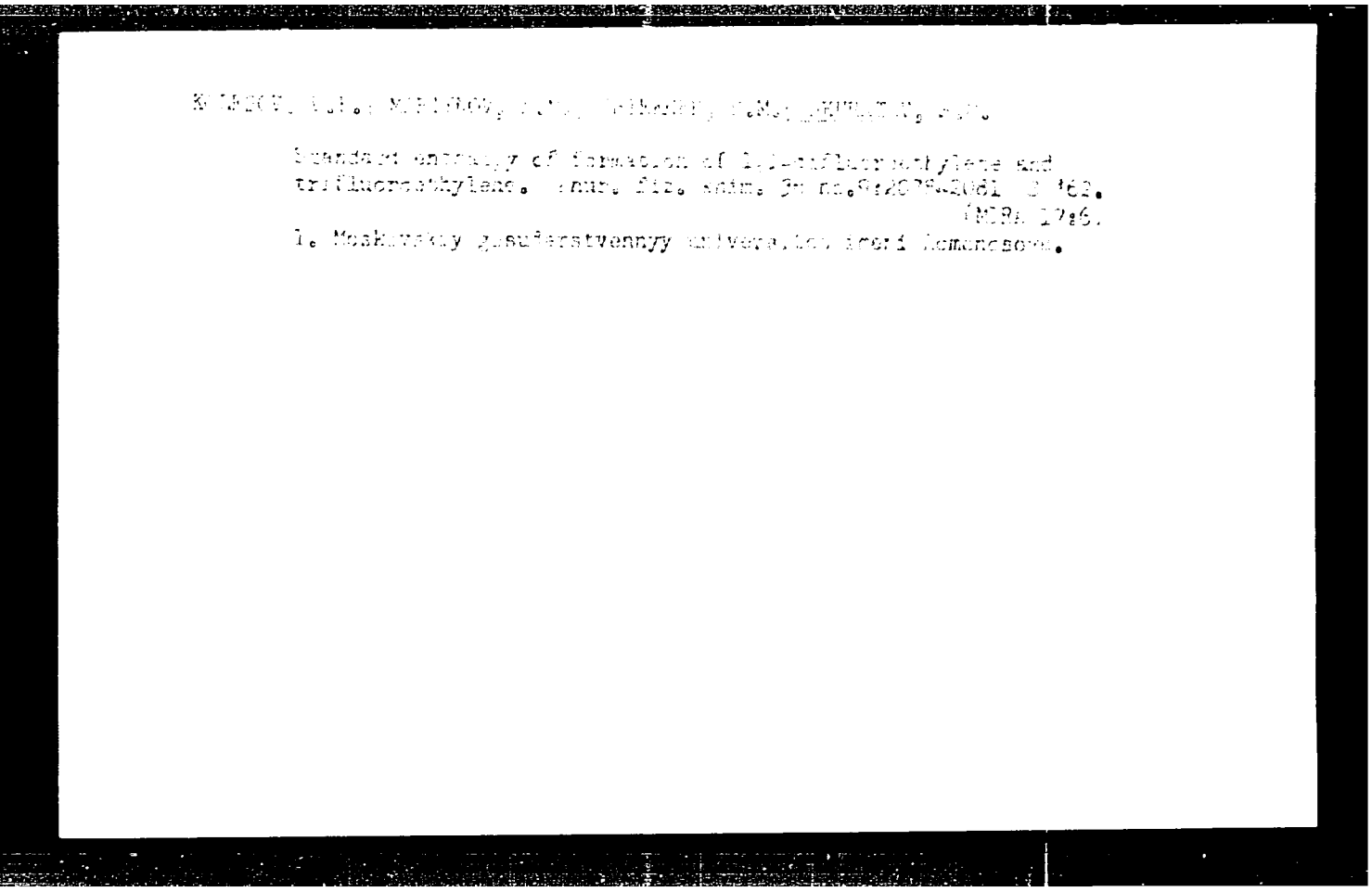
Variation of the isobaric and isothermal potential in the polymerization of lactams under standardized conditions. Zhur. fiz. khim. 36 no.4:770-779 Ap '62. (MIRA 15:6)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Lactams--Thermal properties) (Polymerization)

KOLESOV, V.P.; ZENKOV, I.D.; ALEKHIN, S.P.; SKURATOV, S.M.

Hermetic calorimeter with magnetic stirrer. Zhur. fiz. khim. 36 no.4:910-912 Ap '62. (MIRA 15:6)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Calorimeters)



KOLESOV, V.P., SOKOLOV, I.P., SOKOLOV, S.M.

Standard entropy of formation of chlorotrifluoromethane and dichlorodifluoromethane. Zhur. fiz. khim. 36 no.9:2082-2084 S '62. (MIRA 17:6)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

34825

S/020/62/142/005/016/022
B110/B101

11.2232
11.1240

AUTHORS: Gal'chenko, G. L., Timofeyev, B. I., and Skuratov, S. M

TITLE: Determination of formation heat of decaborane

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 5, 1962, 1077-1080

TEXT: For an accurate determination of the formation heat ΔH^{o}_{form} of decaborane, $B_{10}H_{14}$, the latter was subjected to quantitative thermal decomposition in boron and hydrogen at 700 - 800°C. Decaborane (≈0.8 g) distilled in vacuo to constant melting point was heated in a calorimeter with tungsten wire. The degree of decomposition was determined from the quantitative measurement of H_2 (0.2 % accuracy): (a) by pressure determination in a Hg manometer; (b) gravimetrically after oxidation by copper oxide at 600°C and adsorption to magnesium perchlorate and P_2O_5. The initial temperature was 12.14 ± 0.03°C, the final temperature 24.0 - 24.4°C. Solid pyrolysis products were: (1) fine amorphous powder; (2) slaggy pieces with 5 - 10 % crystalline phase; and (3) coarse crystalline powder

Card (1/3)

Determination of formation heat of ...

with quartzlike structure. BCl_3 formed almost quantitatively during chlorination at 350 - 400°C. The crystalline powder consisted of non-volatile boron hydride, the amorphous substance, of boron $Q_{react} = W \cdot \Delta\vartheta_{exp} - Q_{el}$ is valid; where W = heat value of the calorimeter, $\Delta\vartheta_{exp}$ = temperature increase during the experiment, Q_{el} = heat liberated by the current. Since $Q_{react} : V_{H_2}$ (referred to ϑ = 0°C and P = 760 mm Hg) is practically constant, $Q_{react} : V_{H_2}$ may be referred to $B_{10}H_{14(cryst)} = 10\ B_{(amorph)} + 7\ H_{2(gas)}$. The heat of decomposition $\Delta U_B = -(Q_{react}/V_{H_2}) \cdot 22433.7$. Experimental result: $\Delta U_B = 13.89 \pm 1.0$.

On transition from ΔU to ΔH at ϑ = 25°C and P = 1 atm, only $\Delta n\ RT$ = 4.13 kcal/mole was of importance. ΔH = 18.0 ± 1.0 kcal/mole for $B_{10}H_{14(cryst)} = 10\ B_{(amorph)} + 7\ H_{2(gas)}$ at 25°C and 1 atm. Considering ΔH = - 0.4 kcal/mole for $B_{(amorph)} = B_{(cryst)}$, the result was:

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S/020/62/142/005/016/022
B110/B101

Determination of formation heat of ..

$\Delta H^{o}_{form\ B_{10}H_{14}(cryst)}$ = - 14.0 ± 1.0 kcal/mole which agrees with the value found by W. H. Johnson et al. There are 1 figure, 1 table, and 7 references: 2 Soviet and 5 non-Soviet. The four references to English-language publications read as follows: F. D Rossini et al , Selected Values of Chemical Thermodynamic Properties, Natl. Bur Stand , Circ. 500 (1952). W. H. Evans et al., Thermochemistry and Thermodynamic Functions of some Boron Compounds Symposium on Thermal Properties, N. Y. 1959. B. Siegel, J. L. Mack, J. Phys. Chem., 62, no 3. 373 (1958). W. H. Johnson et al., J. Res. Natl. Bur. Stand., 64A, no 6, 521 (1960).

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: September 18, 1961, by Vikt. I. Spitsyn, Academician

SUBMITTED: September 16, 1961

Card 3/3

S/020/62/144/002/020/028
B101/B144

AP 11552
21.2100

AUTHORS: Kornilov, A. N., Leonidov, V. Ya., and Skuratov, S. M.

TITLE: Standard heats of formation of niobium pentoxide and tantalum pentoxide

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 355-358

TEXT: As the data hitherto published for the heats of formation of Nb_2O_5 and Ta_2O_5 diverge greatly, the heat of combustion, $-\Delta U_B$ (24.3°C), of high-purity Nb and Ta in O_2 was determined calorimetrically after the content of impurities in the metal samples had been determined at two laboratories, and their effect was taken into account in calculating $-\Delta U_B$. (I) The content of impurities (% by weight) in niobium preparation 1 was 0.03 O; 0.03 N; 0.004 H; 0.02 C; 0.30 Ta; 0.09 Fe; 0.12 Ti; and 0.06 Si. In niobium preparation 2, it was 0.01 O; 0.01 N; 0.005 C; 1.27 Ta; 0.07 Fe; 0.12 Ti; and 0.04 Si. The maximum contents of Al, Mg, Mo, Mn, Ni, P, Pb, and Sn did not exceed 0.01% of each. Combustion took place in high-purity O_2 at 30 atm. The effect of moisture was ignored

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Standard heats of formation of ...

when determining the resulting β-Nb_2O_5. In calculating $-\Delta U_B$ (24.3°C), the effect of impurities was considered on the assumption that: (1) O, N, H, and C react with Nb to form Nb_2O_5, NbN, NbH, and NbC, respectively, while the remaining impurities do not react with Nb; (2) none of the impurities reacts with Nb. The relevant corrections were within the experimental errors. It was found that $-\Delta U_B$ (24.3°C) = 2432.0 ± 2.0 cal/g of Nb. Hence, ΔH°_{298} β-Nb_2O_5 = -453.5 ± 0.4 kcal/mole. (II) Tantalum preparation 1 contained the following impurities (% by weight): $6 \cdot 10^{-3}$ O; $1 \cdot 10^{-2}$ N; $3 \cdot 10^{-4}$ H; $2 \cdot 10^{-2}$ C; 0.12 Nb; 0.11 Ti; $3 \cdot 10^{-2}$ Fe; $< 4 \cdot 10^{-3}$ Si; $4 \cdot 10^{-2}$ W; and $1 \cdot 10^{-2}$ Mo. Tantalum preparation 2 contained $4 \cdot 10^{-3}$ O; $2 \cdot 10^{-3}$ N; $1 \cdot 10^{-3}$ H; $5 \cdot 10^{-3}$ C; 0.80 Nb; $< 5 \cdot 10^{-3}$ Ti; $< 2 \cdot 10^{-3}$ Fe; $< 3 \cdot 10^{-3}$ Si; $< 1 \cdot 10^{-2}$ W; and $< 1 \cdot 10^{-2}$ Mo. In each sample, the content of Al, Ni, and Mg was $< 1 \cdot 10^{-3}$. In sample 1, the content of Pb, Bi, Sn, Sb, and Cd was $< 1 \cdot 10^{-3}$, and in sample 2, it was $< 1 \cdot 10^{-4}$. In sample 2, the content of S and P was $< 2 \cdot 10^{-3}$. Combustion took place in O_2 at 10 atm.

Card 2/3

SEREGIN, E.A.; KOLESOV, V.P.; BELIKOVA, N.A.; SKURATOV, S.M.; PLATE, A.F.

Heat capacity at low temperatures and thermodynamic functions of endo- and exo-2-cyano-bicyclo-(2,2,1)-heptane. Dokl.AN SSSR 145 no.3:580-583 Jl '62. (MIRA 15:7)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova. Predstavleno akademikom B.A.Kazanskim.
(Bicycloheptane) (Heat capacity)

VOROB'YEV, A.F.; PRIVALOVA, N.M.; SKURATOV, S.M.

Enthalpy of formation of halogen anions in aqueous solutions.
Vest.Mosk. un. Ser.2: Khim. 18 no.4:39-45 Jl-Ag '63.
(MIRA 16:9)

1. Laboratoriya termokhimii Moskovskogo universiteta.
(Halides) (Thermochemistry)

ACCESSION NR: AP3001607 S/0189/63/000/003/0045/0047

AUTHORS: Vorob'yev, A. F.; Skuratov, S. M.

TITLE: Formation enthalpy of ionic compounds

SOURCE: Moscow. Universitet. Vestnik. 18 Seriya 2. Khimiya, no. 3, 1963, 45-47

TOPIC TAGS: ionic compound, enthalpy, diluted solution, infinitely diluted solution, enthalpy of ion formation, enthalpy of ion solution

ABSTRACT: The article presents a procedure developed for determining the formation enthalpies of various compounds. The purpose of the study was to obtain accurate results and to avoid time-consuming experiments. The method used was based on determining the enthalpies of different ions formed in an infinitely diluted solution and also the enthalpy of their solution. The formula used for these determinations was

$$\Delta H_{обр}(AB_{тв}) = \Delta H_{обр}(A^{+}_{р\text{-}р\,\infty}) + \Delta H_{обр}(B^{-}_{р\text{-}р\,\infty}) - \Delta H_{р\text{-}рен\,\infty}(AB_{тв}),$$

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ACCESSION NR: AP3001607

where $\Delta H_{\infty p}(AB_{TB})$ is enthalpy of the formation of a solid AB compound; $\Delta H_{\infty p}(A^{+}_{p\text{-}p\ \infty})$ and $\Delta H_{\infty p}(B^{-}_{p\text{-}p\ \infty})$ are formation enthalpies of A^{+} and B^{-} ions in an infinitely diluted solution; and $\Delta H_{p\text{-}p\text{-}H\ \infty}(AB_{TB})$ is the solution enthalpy of a solid AB compound to an infinitely diluted solution. Knowing the enthalpy of ion formation in the infinitely diluted solutions and the enthalpy of their solution, the enthalpies of compounds formed by these ions can be calculated. The values of the ion formation enthalpies are found from the equation

$$\Delta H_{o6p}(A^{+}_{p\text{-}p\ \infty}) = \Delta H_{o6p}(AB_{TB}) + \Delta H_{p\text{-}p\text{-}H\ \infty}(AB_{TB}) - \Delta H_{o6p}(B^{-}_{p\text{-}p\ \infty}).$$

Orig. art. has: 2 formulas.

ASSOCIATION: none

SUBMITTED: 02Apr62 DATE ACQ: 09Jul63 ENCL: 00

SUB CODE: CH, PH NO REF SOV: 000. OTHER: 001

Card 2/2

ACCESSION NR: AP3001608 S/0189/63/000/003/0048/0051

AUTHORS: Vorob'yev, A. F.; Monayenkova, A. S.; Privalova, N. M.; Skuratov, S. M.

TITLE: Enthalpy of formation for OH^-, K^+, Na^+, Li^+ ions in water solutions

SOURCE: Moscow. Universitet. Vestnik. Seriya 2, Khimiya, no. 3, 1963, 48-51

TOPIC TAGS: alkali, enthalpy of formation, hydroxyl ion, cation, dilute solution

ABSTRACT: The enthalpy of formation for OH^- and alkaline ions has been calculated at 25C using international tables, 1961 edition, for the atomic weights. A root mean square error analysis has been made to determine the limits of calculation accuracy. For the hydroxyl ion, the calculation is based on the neutralization enthalpy of a strong acid by a strong base in an infinitely dilute solution: $OH^-_{(p\text{-}p\infty)} + H^+_{(p\text{-}p\infty)} = H_2O_{(liquid)}$. This leads to the values

$$\Delta H_F(OH^-_{p\text{-}p\infty}) = \Delta H_F(H_2O_{liq}) - \Delta H_{neut} - \Delta H_F(H^+_{p\text{-}p\infty}) =$$
$$= (-68{,}32 \pm 0{,}01) - (-13{,}34 \pm 0{,}02) - 0 = -54{,}98 \pm 0{,}02 \text{ kcal/g-ion}.$$

When the enthalpy of formation of the hydroxyl ion is known, the ΔH_F of the cation alkali metals can be determined from the known ΔH_F of alkali-hydroxides in an infinitely dilute

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ACCESSION NR: AP3001608

solution. In an equation form this yields $\Delta H_{F}(M^{+}_{p\text{-}p\infty}) = \Delta H_{F}(MOH_{p\text{-}p\infty}) - \Delta H_{F}(OH^{-}_{p\text{-}p\infty})$, M = Na, Li, K. Finally, the enthalpy of formation for OH^{-} and the three alkalies is listed as

Ион	OH^{-}	Na^{+}	K^{+}	Li^{+}
ΔH_{F} ккал/г-ион	−54,98±0,02	−57,50±0,02	−60,34±0,02	−66,58±0,04

Orig. art. has: 3 formulas.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet,Laboratoriya termokhimii (Moscow State University, Laboratory of Thermochemistry)

SUBMITTED: 02Apr62 DATE ACQ: 09Jul63 ENCL: 00

SUB CODE: GC NO REF SOV: 003 OTHER: 015

Card 2/2

KOLESOV, V.P.; ZENKOV, I.D.; SKURATOV, S.M.

Standard enthalpy of formation of chlorotrifluoroethylene. Zhur. fiz.khim. 37 no.1:224-225 Ja '63. (MIRA 17:3)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

S/076/63/037/003/020/020
B101/B215

AUTHORS: Kolesov, V. P., Zenkov, I. D., Skuratov, S. M.

TITLE: Standard enthalpies of the formation of chlorotrifluoro methane and dichlorodifluoro methane

PERIODICAL: Zhurnal fizicheskoy khimii, v. 37, no. 3, 1963, 720

TEXT: The data for ΔH^{o}_{form} of CCl_2F_2 given in Zh. fiz. khimii, 36, 2082, 1962 were checked and found correct. The following values are given: $\Delta H^{o}(CCl_2F_2) = -112.1 \pm 1.2$ kcal/mole, $\Delta H^{o}(CClF_3) = -171.8 \pm 0.9$ kcal/mole. These were determined calorimetrically on the basis of the reaction $CCl_nF_{(4-n)} + 4\ Na = nNaCl + (4-n)NaF + C$.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Khimicheskiy fakul'tet (Moscow State University imeni M.V. Lomonosov Chemical Division)

SUBMITTED: September 7, 1962

Card 1/1

SKURATOV, S.M.; KOLESOV, V.P.

Second All-Union Conference on Calorimetry. Zhur.fiz.khim. 37 no.10: 2379-2383 O '63. (MIRA 17:2)

KORNILOV, A.N.; ZAYKIN, I.D.; MARTYNOV, Yu.A.; SKURATOV, S.M.

Dosage of the electrical energy supplied to the calorimeter bomb for ignition of substances. Zhur. fiz. khim. 37 no.11: 2606-2608 N'63. (MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

YEREMIN, Ye.N., prof.; KISELEV, A.V., prof.; KOBOZEV, N.I., prof.; PANCHENKOV, G.M., prof.; POLTORAK, O.M., prof.; SKURATOV, S.M., prof.; TATEVSKIY, V.M., prof.; TOPCHIYEVA, K.V., prof.; FIGUROVSKIY, N.A., prof.; FILIPPOV, Yu.V., prof.; SHAKHPARONOV, M.I., prof.

IAkov Ivanovich Gerasimov; on his sixtieth birthday. Zhur. fiz. khim. 37 no.12:2803-2804 D '63. (MIRA 17:1)

1. Kafedra fizicheskoy khimii Moskovskogo gosudarstvennogo universiteta.

SKURATOV, Sergey Mikhaylovich; KOLESOV, Viktor Petrovich; VOROB'YEV, Adol'f Fedorovich; SOKOLOV, V.A., nauchn. red.; KOROBKOVA, N.A., red.

[Thermochemistry] Termokhimiia. Moskva, Izd-vo Mosk. univ. Pt.1. [General data on thermometry and calorimetry] Obshchie svedeniia o termometrii i kalorimetrii. 1964. 301 p. (MIRA 17:5)

SKURATOV, S.M.; GOROSHKO, N.N.

Simple bridge circuit for measuring the resistance of a platinum thermometer. Izm.tekh. no.2:6-8 F '64. (MIRA 17:4)

L 15702-65 EPA/EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Paa-4/Pr-4/
Ps-4/Pt-10/Pi-4 AEDC/ASD-3/AFFTC/SSD/AFGC/RPL/AEDC(a)/AFWL/ASD(p)-3
BW/WW/JW/JWD/WE/RM

B

ACCESSION NR: AP4044076 S/0189/64/000/004/0003/0006

AUTHORS: Goroshko, N.N. Kozina, M.P.; Skurstov, S.M.; Belikova, N.A.; Plate, A.F.

TITLE: Heats of combustion of exo-and endo-isomers-- 2-cyano-bicyclo-(2,2,1)heptane

SOURCE: Moscow.Universitet. Vestnik. Seriya. Khimiya, no. 4, 1964, 3-6

TOPIC TAGS: bicycloheptane derivative, cyano bicyclo heptane, endo isomer, exo isomer, heat of combustion, heat of isomerization, enthalpy, plastic crystal

ABSTRACT: The heats of combustion of the exo and endo isomers and the heat of isomerization ($\Delta H_{exo \rightarrow endo}$) of 2-cyano-bicyclo-(2,2,1)-heptane were determined in the Moscow State University Thermochemical Laboratory (v termokhimicheskoy laboratorii MGU) study of the thermodynamic properties of bicyclo-(2,2,1)heptane derivatives, of interest because of their high symmetry suitable for forming "plastic

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L 15702-65

ACCESSION NR: AP4044076

crystals". The enthalpy for the exo-isomer, calculated at initial bomb pressure of 1 atm, $-\Delta H_c^{300} = 1132.44 \pm 0.31$ kcal/mol, and for the endo- isomer, $-\Delta H_c^{25^\circ} = 1132.98 \pm 0.35$ kcal/mol. The heat of isomerization was calculated at 76.80, at which temperature both isomers were liquid. $\Delta H_{c\,exo}^{76.8^\circ} = 1130.09 \pm 0.31$ and $\Delta H_{c\,endo}^{76.8^\circ} = 1131.05 \pm 0.35$ kcal/mol; exo → endo heat of isomerization = -0.96 ± 0.44 kcal/mol. Orig. art. has: 3 tables.

ASSOCIATION: MGU Kafedra fizicheskoy khimii (Moscow State University Department of Physical Chemistry)

SUBMITTED: 03Mar64 DATE ACQ: ENCL: 00

SUB CODE: TD, GC NR REF SOV: 004 OTHER: 004

Card 2/2

ACCESSION NR: AP4033403 S/0076/64/038/003/0702/0707

AUTHORS: Kornilov, A.N. (Moscow); Zaykin, I.D. (Moscow); Skuratov, S.M. (Moscow); Dubrovskaya, L.B. (Moscow); Shveykin, G.P. (Moscow)

TITLE: Standard heats of formation of tentalum carbides from Ta sub 2 C phase

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 3, 1964, 702-707

TOPIC TAGS: tantalum carbide, heat of combustion, heat of formation, Ta sub 2 C phase, impurity

ABSTRACT: The heats of combustion of tantalum carbide with $TaC_{0.455}$ (1) and $TaC_{0.507}$ (2) composition from the Ta_2C phase have been determined. The carbides had less than $5 \cdot 10^{-2}$ weight % of Sn, Cu and Mn impurities and less than $1 \cdot 10^{-3}$ weight % of Sb, Ni, Mg, Zr, Ca, Al, W, Pb, Bi and Cd impurities. The carbon content of the carbides was determined with 0.01 - 0.02 % accuracy from the content of CO_2 produced upon combustion of carbide in a stream of oxygen at 1050C. The O, N and H content was determined by the vacuum fusion method with accuracy ± 0.02 % for O and N and ± 0.001 % accuracy for H. The Nb,

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Si, Ti and Fe content was determined spectrographically with accuracy of ± 0.01 - 0.02 %. The other impurities were determined by spectral analysis with accuracy of ± 0.001 - 0.005 %. By x-ray phase analysis it was established that compounds 1 and 2 are homogeneous and have hexagonal lattice with the following lattice parameters: a=3.104 Å, c=4.936 Å and a=3.105 Å, c=4.936 Å respectively. The conditions for the combustion of carbides with respect to tantalum and carbon were chosen to be approximately 100 %. The errors in the values for the ΔH^{o} of formation for (1) and ΔH^{o} of formation for (2) include the errors of determination of the heat of combustion of carbides, errors of the determination of ΔH^{o} of formation of Ta_2O_5 and ΔH^{o} of formation of CO_2 and the errors of the index for carbon in the carbide formulae. The calculated standard heats of formation for (1) and (2) from tantalum metal and β-graphite were: ΔH^{o} of formation for 1 is equal to -23.3 ± 1.0 kcal/g-formula wt. and ΔH^{o} of formation for 2 is equal to -25.1 ± 1.0 kcal/g-formula wt. Orig. art. has: 3 tables.

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ACCESSION NR: AP4033403

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University im. M.V. Lomonosov) Institut khimii Ural'skogo filiala AN SSSR (Institute of Chemistry of the Ural Branch of the Academy of Sciences SSSR)

SUBMITTED: 20Aug63 ENCL: 00

SUB CODE: IC NR REF SOV: 012 OTHER: 003

Card 3/3

KOLESOV, V.P.; GALAKIN, O.G.; SKURATOV, S.M.

Standard enthalpy of formation of perfluorocyclobutane.
Zhur. fiz. khim. 38 no.6:1701-1703 Je '64.
(MIRA 18:3)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

KOLESOV, V.P.; ZENKOV, I.D.; SKURATOV, S.M.

Standard enthalpy of formation of 2,2,2-trifluoroethanol.
Zhur.fiz.khim. 39 no.10:2474-2476 O '65.
(MIRA 18:12)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
Submitted July 13, 1964.

L 20104-65 EWG(j)/EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(j)/EWP(t)/EWP(b) Pc-4/Pr-4/Ps-4/Pi-4/Pu-4 IJP(c)/RPL/AEDC(a)/SSD/AFWL/AS(mp)-2/AFMDC/ESD(t) JD/WW/JW/JG/RM

ACCESSION NR: AP4044442 S/0076/64/038/008/2008/2012

AUTHOR: Kornilov, A. N. (Moscow); Leonidov, V. Ya. (Moscow); Skuratov, S. M. (Moscow)

TITLE: Standard heat of formation of tantalum pentoxide

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 8, 1964, 2008-2012

TOPIC TAGS: tantalum pentoxide, enthalpy, calorimetry, heat of formation

ABSTRACT: The purpose of this work was to resolve the discrepancy existing in literature for the heat of formation of Ta_2O_5. For this purpose two different preparations of high purity tantalum in the form of ingots were used. Ta as shavings was used for the determination in a calorimetric bomb. Traces of iron on the surface of tantalum, which is picked up during shaving of the metal, is removed by boiling with HCl for 0.5 hours. Other impurities, oxygen, CO_2 and H_2O were removed by passing Ta over heated cupric oxide at 600 C and ascarite. The fraction of tantalum oxidized in the bomb comprised 99.5-99.9% and it was determined with accuracy of $2-3 \cdot 10^{-2}$%, from the amount of oxygen consumed at

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ACCESSION NR: AP4044442

1050 C in the course of 2.5-3 hours. It was determined that for the reaction 2Ta (cryst.) + 5/2 O_2 (g) = Ta_2O_5(α-modification). ΔH^o_{298} = -489.3 ± 0.4 kcal
Orig. art. has: 1 table

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosov Termokhimicheskaya laboratoriya im. V. F. Luginina (Moscow State University Thermochemistry Laboratory)

SUBMITTED: 19Oct63 ENCL: 00

SUB CODE: GC NO REF SOV: 005 OTHER: 010

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L 20105-65 EWG(j)/EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(j)/EWP(t)/EWP(b) Pc-4/Pr-4/Ps-4/Pi-4/Pu-4 IJP(c)/RPL/AEDC(a)/SSD/AFWL/AS(mp)-2/AFMDC/ESD(t) RD/WW/JW/JG/RM

ACCESSION NR: AP4044443 S/0076/64/038/008/2013/2018

AUTHOR: Kornilov, A. N. (Moscow); Leonidov, V. Ya. Moscow); Skuratov, S. M. (Moscow)

TITLE: Standard heat of formation of niobium pentoxide

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 8, 1964, 2013-2018

TOPIC TAGS: niobium pentoxide, enthalpy, calorimetry, heat of formation

ABSTRACT: The standard heat of formation of Nb_2O_5 was determined by a direct combustion method. Relatively pure Nb (low in O, N, and H) was placed in a calorimeter bomb for combustion in O_2. To assure high accuracy, Nb was burned to completion (>99%). A special method was used to determine the completeness of the combustion because the combustion product Nb_2O_5 tends to fuse together and be hygroscopic. It was determined for:

$$2Nb(crystal) + 5/2\ O_2(g) = Nb_2O_5\ (\beta\text{-modification})$$

$$H^{o}_{288} = -453.5 \pm 0.4\ kcal.$$

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